

CLAIMSWhat is claimed is:

1. An electronically scanned array, comprising:
a linear array of radiating elements;
an array of phase shifters coupled to the radiating
elements;

5 an RF manifold including a plurality of phase shifter
ports respectively coupled to a corresponding phase shifter
RF port and an RF port; and

a beam steering controller for providing phase shift
control signals to the phase shifters to control the phase
shift setting of the array of the phase shifters;

10 and wherein said phase shifters each include a plural-
ity micro-electro-mechanical ("MEM") switches responsive to
said control signals to select one of a discrete number of
phase shift settings for the respective phase shifter.

2. The array of Claim 1, wherein said phase shifters
include switched line phase shifters including a reference
signal path and at least one phase shift signal path, each
path having an electrical length selected to provide a
phase shift value at an operating wavelength, and wherein
5 the plurality of MEM switches are configured to select
either said reference path or one of said at least one
phase shift path.

3. The array of Claim 1 wherein said phase shifters
include reflection phase shifters, wherein the MEM switches
are connected to select one of a plurality of reactance
values determining a phase shift value.

4. The array of Claim 3, wherein said reflection
phase shifters each comprise a coupler device having first

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and second RF I/O ports, and in-phase and quadrature ports,
and first and second reactance circuits respectively
5 coupled to the in-phase and quadrature ports by first and
second MEM switch circuits.

5 5. The array of Claim 1 wherein said MEM switches are
single-pole-single-throw (SPST) switches including an
armature for opening and closing the RF signal path through
the switch, and a control signal path, and wherein the
control signals are isolated from the RF signal path.

6. An RF phase shifter circuit, comprising:
first and second RF ports;
a switch circuit comprising a plurality of single-
pole-single-throw (SPST) micro-electro-mechanical ("MEM")
5 switches responsive to control signals, said switch circuit
arranged to select one of a plurality of discrete phase
shift values introduced by the phase shifter circuit to RF
signals passed between the first and second RF ports, said
circuits connected to provide a single-pole-multiple-throw
10 (SPMT) or multiple-pole-multiple-throw (MPMT) switch
function.

7. The circuit of Claim 6, wherein said phase shift
circuit is a switched line phase shift circuit, and further
includes a reference phase signal path and at least one
phase shift path, said switch circuit arranged to select
5 one of said reference or said at least one signal paths in
response to phase shift control signals.

8. The circuit of Claim 6, wherein a single MEM
switch selects said reference signal path.

9. The circuit of Claim 8, wherein said single MEM
switch provides said reference signal path.

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10. The circuit of Claim 6 wherein said phase shifter is a reflection phase shifter, wherein the MEM switch circuit is arranged to select from a plurality of termination reactance values determining a phase shift value.

5 11. The circuit of Claim 10, further comprising a coupler device having first and second RF I/O ports, and in-phase and quadrature ports, said MEM switch circuit includes first and second reactance switch circuits selectively coupling first and second termination reactance circuits respectively to the in-phase and quadrature ports, each said reactance circuit including a plurality of selectable reactance values.

5 12. The circuit of Claim 11, wherein said first and second reactance switch circuits are arranged to select more than one of said plurality of said selectable reactance values for simultaneous termination of said in-phase and quadrature ports by said more than one of said plurality of selectable reactance values.

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C1 13. The circuit of Claim 12, wherein said first and second MEM switch circuits provide MPMT switching functions.

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C1 14. The circuit of Claim 6, wherein said MEM switches are metal-metal contact RF MEMS series switches.

15. A multi-section RF phase shifter circuit, comprising:

5 a plurality of phase shift sections connected in series to provide a discrete set of selectable phase shifts to RF signals passed through the circuit, and wherein each phase shift section includes:

first and second RF ports;

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17. The circuit of Claim 16, wherein a single MEM switch selects said reference signal path.

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20. The circuit of Claim 19, wherein said first and second reactance switch circuits are arranged to select more than one of said plurality of said selectable reactance values for simultaneous termination of said in-phase and quadrature ports by said more than one of said plurality of selectable reactance values.

21. The circuit of Claim 20, wherein said first and second MEM switch circuits provide MPMT switching functions.

22. An RF switch circuit configured to provide a single-pole-multiple-throw (SPMT) or multiple-pole-multiple-throw switch (MPMT) function to RF signals, comprising a plurality of single-pole-single-throw (SPST) micro-electro-mechanical ("MEM") RF switches each responsive to DC control signals to control the open/closed state of the switch, said SPST MEM switches each including a first RF port and a second RF port, and wherein at least first and second ones of said SPST switches have said first ports connected at a common junction.

23. The switch circuit of Claim 22, wherein said SPST MEM switches are metal-metal contact RF MEMS series switches.

24. The switch circuit of Claim 22, wherein said function is a SPMT switch function, the number of switch throws is N, and said at least first and second ones of said SPST switches with said first ports connected at a common junction includes N SPST switches with respective first ports at said common junction.

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